

BENEFITS OF RENEWABLE NATURAL GAS FOR FARMERS

In 2018, there were fewer than 20 operational renewable natural gas (RNG) projects located on farms and at agricultural facilities in North America. As of 2023 there are 150 such projects, producing RNG from animal manures and crop waste.

MANURE MANAGEMENT

Conventional agricultural practices produce significant greenhouse gas (GHG) emissions, and few solutions to address these have yet been deployed at scale. Producing RNG from livestock manure, using technology that is commercially available today, is an improved form of manure management that reduces agricultural emissions.

As a first step to generating RNG from livestock manure, the manure is placed in the oxygen-free environment of an anaerobic digester which may be an enclosed, above-ground tank or a large covered pit (depending on the climate). Inside the digester, the manure releases a biogas that is roughly 60% methane and 40% CO₂ and other impurities. The biogas is collected, and after a basic clean-up can be combusted to provide heat and electricity for the farm. Because the manure was recently plant matter, the CO₂ from using the biogas is considered biogenic, and therefore carbon neutral.

Agricultural digesters can further contribute to emissions reductions by combining manure with food waste from municipalities or the food industry. This practice of co-digestion is spreading on farms in both Canada and the U.S.

CLEAN ENERGY

To produce RNG, also known as biomethane in some jurisdictions, biogas is put through an additional clean-up process to remove CO₂, impurities and moisture. This leaves a gas that is 95% or more methane, and can be used in place of conventional natural gas across applications. RNG produced from livestock manures boasts one of the lowest *carbon intensities of any fuel available* because it prevents far more emissions of greenhouse gases — particularly methane — than it produces.

The ability to produce biogas and RNG makes a historically burdensome byproduct of farms — their waste — more valuable. Whether it's crop residue or livestock manure, waste is a natural part of the agricultural process, and farmers have to manage and dispose of it on a regular basis. Other farmers, in addition to generating their own electricity and heat from biogas, gain access to additional income by producing RNG and selling it into transportation and thermal markets.

NON-CHEMICAL FERTILIZER

Livestock manures have been used as fertilizer on farms for millennia, as they contain many of the nutrients required by crops and found in commercial fertilizer. However, land applying manure

has drawbacks, including the strong odor it produces and the flies that it attracts (which are both a nuisance and a vector for spreading pathogens). It can also wash into local water bodies when it rains.

However, livestock manure put through an anaerobic digester not only produces energy, but also digestate — the organic materials, both solid and liquid, left over from the digestion process. Digestate contains all the nutrients of the original manure, but is much less odorous, and pathogens in the manure are largely killed off by the anaerobic digestion process. This means that farmers can have the benefits of spreading manure without the drawbacks.

Digestate can be applied to the soil whole or separated into its liquid and solid portions. The liquid portion of digestate is more readily absorbed by the soil than manure, and so provides more nutrients; this quality can be enhanced by injection into the soil, as is relatively common with liquid fertilizers. Better absorption and injection reduce the potential for dust, run-off, and for nitrogen to be “volatilized” and lost to the air as ammonia.

The solid portion of digestate can be used as a form of compost or as a soil additive. It returns organic matter to the soil, strengthening it and improving its ability to retain water and nutrients, while also sequestering carbon in the soil.

The use of solid and liquid digestate can improve soil health and crop yields, while reducing farmers’ dependence — and expenditures — on chemical fertilizers.

ANIMAL BEDDING

Solid digestate is a fibrous material that can also be used as animal bedding, in place of sawdust, sand, woodchips or straw. This can yield significant savings to farmers; bedding from outside suppliers can add tens of thousands of dollars to even a small farm’s budget.

RNG: A TOOL FOR FARMERS TO LEAD THE DECARBONIZATION OF AGRICULTURE

Recent decades have not always been kind to North American farms. Commodity price swings, uncertainty over trade and tariff policies, and even climate warming impacts have all contributed to pressure on regional farms in recent years; a wave of consolidation in the sector has increased these pressures, with smaller operations struggling to compete without the economies of scale their larger rivals enjoy.

RNG and its byproducts offer one way for North American farms — both large and small — to turn an economic liability into an economic support, creating additional income for an industry synonymous with the values of hard work and economic opportunity for all. To achieve net zero GHG emissions, all sectors of the economy need to decarbonize. RNG allows farmers to take an active role in cutting agricultural emissions, while supplying clean fuel to decarbonize other sectors.